CHRYSOTHAMNUS NAUSEOSUS SSP. *IRIDIS* (ASTERACEAE): A NEW ENDEMIC FROM UTAH

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Abstract.— *Chrysothamnus nauseosus* ssp. *iridis* was named from material taken in Sevier County, Utah.

The Rainbow Hills, southeast of Sigurd in Sevier County, Utah, are of considerable interest biologically. Several plant species are endemic to the area or have ranges that extend only slightly beyond. The list includes *Astragalus loanus* Barneby, *Cymopterus coulteri* (M. E. Jones) Mathias, *C. rosei* M. E. Jones, *Mentzelia argillacea* Darlington, *Phacelia utahensis* Voss, and *Townsendia aprica* Welsh & Reveal. Now, an endemic subspecies of *Chrysothamnus nauseosus* (rabbit brush) may be added to the group.

Materials and Methods

All known collections of the new taxon were used for comparative floral morphology (prepared from five heads per collection as in Anderson, 1964). Materials for chromosome counts and anatomical study were preserved and processed as in earlier studies (Anderson 1966, 1970).

Taxonomy and Morphology

***Chrysothamnus nauseosus* (Pallas) Britt. ssp. *iridis* L. C. Anderson,** ssp. nov.

Frutices humiles et diffundentes usque ad 2 dm alti, stirpibus glauco-albis, sine ramis infra inflorescentiam; folia glauco-viridia, linearia, 2–4 cm longa, 1 mm lata, multo longiora internodis; inflorescentia cyma paniculata et conglobata; capitula 12–16 mm longa, bracteis glabris; disci florum 5, flavi, corollis 7.8–9 mm longis, lineis stigmaticis longioribus quam styli appendicibus; achaenia glabra.

Type: Utah, Sevier Co., seepage area of E-facing slope underlaid by Arapian Shale, elev. 5900 ft, Rainbow Hills, 4.5 mi SE of Sigurd, 26 Sep 1979, *S. L. Welsh 19258* (BRY-holotype!, FSU!, isotypes widely distributed as *C. parryi* var. *attenuatus*).

Low, spreading shrub 1–1.5 (2) dm tall, stems grayish white, tomentose, ascending, branched from the base; leaves grayish white or green, alternate, entire, linear (2)2.5–3(4) cm long, 1 mm wide, tomentulose, tips mucronate; inflorescence a tightly congested paniculate cyme; heads (12)13–15(16) mm long, 2.3–2.9 mm wide, phyllaries 20–26, stramineous, ovate to lanceolate, glabrous with hyaline margins somewhat ciliate distally, tips acute to acuminate; disk flowers 5, yellow, corollas (7.8)8.2–8.7(9) mm long, lobes 1.5–1.8 mm long, lanceolate, slightly spreading; style 17–18.5 mm long, stigmatic lines shorter than style appendages (29–35 percent of style branch length); achenes cylindric, 6–7(8.5) mm long, glabrous, pappus 5.5–7.2 mm long; $n = 9$. Locally established on steep slopes of Rainbow Hills, Peterson Creek drainage, Sevier County, Utah.

Additional specimens examined: Type locality, 31 Aug 1980, *L. C. Anderson 5110* (BRY, FSU).

Relationships of this new subspecies are with some of the other glabrous-achened taxa of *C. nauseosus* (ssp. *leiospermus* and ssp. *psilocarpus*), although in growth form and general appearance it does look somewhat like *C. parryi* ssp. *attenuatus*. The Rainbow Hills rabbitbrush has glabrous involucres like ssp. *leiospermus*, but more leaves and whitish tomentose stems like ssp. *psilocarpus*. Perhaps the more abundant foliage of ssp. *iridis* relates to greater moisture availability on the seepage area (see Anderson 1973). It is fur-

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ther distinguished from ssp. *leiospermus* in having longer involucres that contain more phyllaries, longer corollas, and longer corolla lobes that spread. The corolla lobes are straight or incurved in ssp. *leiospermus*. It also differs from ssp. *psilocarpus* in having longer heads with more phyllaries, slightly shorter corollas, and shorter stigmatic lines.

The new rabbitbrush is diploid (n = 9, *Anderson 5110*), as are all subspecies of *C. nauseosus* (Anderson 1966, 1980). Good bivalent formation occurs in meiosis; no micronucleoli were observed in microsporocytes as were seen in some other subspecies (Anderson 1980). Pollen stainability in aniline blue in lactophenol averaged 94.6 percent.

Floral anatomy is very similar to that found in other glabrous-achened subspecies in terms of abundance of vasculature and secretory canals, but it differs in pattern. Flower vasculature consists of five to usually six bundles in the ovary wall. Four phloic traces are directed toward the base of the style at the top of the achene, but two end blindly there. Five bundles supply the corolla and androecium; the sixth bundle serves as one of the two style traces (termed pattern "d" in Anderson 1970). This pattern of vascular transition for stylar supply is more frequent in other species of the genus than in *C. nauseosus*; it was previously only known for *C. n.* ssp. *ceruminosus*, which is not closely related to ssp. *iridis*. Trichomes (glandular villi) on the corolla tube are either larger (136–175 μm) or more abundant than those of ssp. *leiospermus* and ssp. *psilocarpus*.

Abundance and distribution of floral vasculature and secretory canals in *C. nauseosus* ssp. *iridis* are much like those of ssp. *psilocarpus*; both subspecies have more ovarian bundles in their achenes than does ssp. *leiospermus*, but the latter has greater amounts of floral secretory canals. The index of specialization (on a scale of 10) as determined from vasculature and secretory canal abundance (Anderson and Fisher 1970) ranges from 2.3–6.7 for *C. nauseosus*. Subspecies *leiospermus* and *psilocarpus* have indexes from 6.1–6.2, and ssp. *iridis* has an index of 6.2–6.3. They are closely related in that respect but are easily distinguished in overall morphology.

This Rainbow Hills rabbitbrush is unique in its very narrow habitat tolerance. Most *Chrysothamnus* taxa are noted for their great ecological amplitude (expressed in a great range of edaphic conditions and/or latitude and altitude). For example, *C. viscidiflorus* ssp. *viscidiflorus* in northern Washoe County, Nevada, occurs in the following: Newlands fine loam, pH 6.2–6.4; Olson gravelly fine sandy loam, pH 6.6–7.0; Karlo very stony silty clay, pH 7.5–8.0; Disabel silty clay loam, pH 8.2–8.4 (Summerfield, pers. comm.). All plants have similar morphology when grown in the same soil in the greenhouse. Subspecies *viscidiflorus* occurs from 34° to over 48° in latitude and 800–13,000 ft in elevation.

In *Chrysothamnus nauseosus*, some of the great range of adaptability is demonstrated with the following: alkalinity and salinity in soils tested for ssp. *consimilis* ranged from pH 5.6 to pH 8.6 and from ECE (mmhos/cm) of 0.2 to 250; those for ssp. *hololeucus* had pH of 6.5–8.9 and ECE of 0.1–6.3. *Chrysothamnus nauseosus* ssp. *iridis* was found exclusively on the rather barren seepage area (dry at flowering time) of about 1,000 sq. ft; the soil is highly gypsiferous. The typical sagebrush-shadscale vegetation surrounding the seepage contained *C. nauseosus* ssp. *consimilis* and *C. viscidiflorus* ssp. *puberulus*; *C. nauseosus* ssp. *leiospermus* was found on rhyolite cliffs a few hundred feet up the hillside. The extremely limited range of *C. nauseosus* ssp. *iridis* and associated endemism make the Rainbow Hills an area very worthy of conservation and protection.

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